

TILLSONBURG

**water pollution
control plant**

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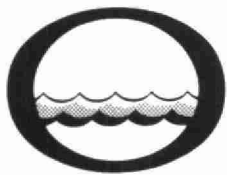
Division of Plant Operations

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Water management in Ontario

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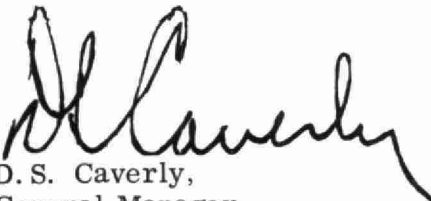
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Toronto 7
Ontario

We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.


D. S. Caverly,
General Manager.


D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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TILLSONBURG
water pollution control plant

operated for

THE TOWN OF TILLSONBURG

by the

ONTARIO WATER RESOURCES COMMISSION

1968 ANNUAL OPERATING SUMMARY

FOREWORD

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

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'68 REVIEW

The average flow treated at the plant during the year was 718,000 gallons per day, which was 108% of the design capacity of 665,000 gpd. This represents a 6% decrease in flow from 1967. During the peak month of February, the average daily flow was 128% of the design capacity. An expansion of the treatment facilities at the plant is absolutely necessary. It is interesting to note that in 1964, the plant was overloaded 2% of the time; in 1965, 24% of the time; in 1966 81% of the time; in 1967, 97% of the time and in 1968, 90% of the time.

A raw sewage having an average strength of 247 mg/l BOD and 236 mg/l suspended solids was treated. Fair removals were obtained by the plant resulting in a 93% reduction in BOD and an 96% reduction in suspended solids compared with 92% and 88% respectively in 1967. A total of 599,100 lbs. of BOD and 532,900 lbs. of suspended solids was removed.

A total of 4,003,000 gallons of raw sludge was treated by the digester, and 760,000 gallons of digested sludge was hauled by truck. An additional 89,000 gallons of raw sludge was hauled. Proper chlorination of the final effluent was maintained throughout the year. Inspections of the structures and grounds showed that they were well maintained and in good condition. An electrical and mechanical inspection was made of the project equipment and no major deficiencies were discovered.

The operating cost for the year was \$32,604.46, an increase of approximately \$278.28 over the cost in 1967. The unit cost of treating one million gallons increased from \$116.56 in 1967 to \$123.91 in 1968 due to slightly decreased flows, and increased costs in general.

PROJECT COSTS

NET CAPITAL COST (Final)	
Long Term Debt to OWRC	<u>\$608,456.51</u>
Debt Retirement Balance at Credit	
(Sinking Fund) December 31, 1968	<u>\$104,449.08</u>
Net Operating	\$ 32,604.46
Debt Retirement	12,274.00
Reserve	2,834.33
Interest Charged	<u>34,152.56</u>
TOTAL	<u>\$ 81,865.35</u>

RESERVE ACCOUNT

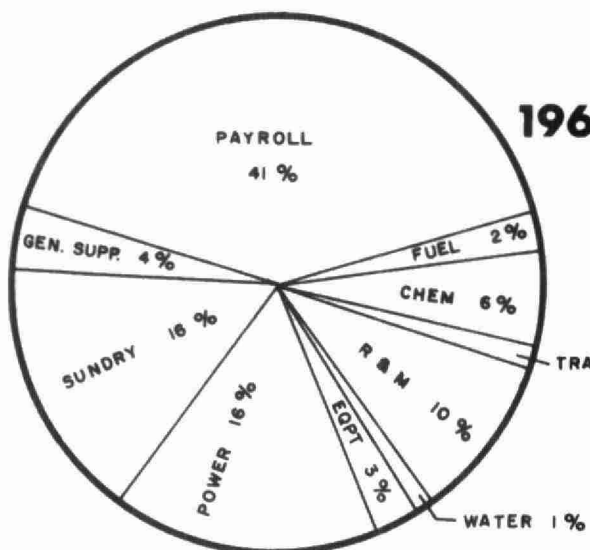
Balance at January 1, 1968	\$ 27,383.18
Deposited by Municipality	2,834.33
Interest Earned	1,612.41
	\$ 31,829.92
Less Expenditures	<u>1,871.62</u>
Balance at December 31, 1968	<u>\$ 29,958.30</u>

Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	1990.22	915.02	-	-	430.20	-	66.17	-	101.76	380.25	16.00	80.82
FEB	2680.43	915.02	-	217.50	366.12	-	59.93	292.80	416.69	396.37	16.00	-
MAR	2403.60	1455.31	-	124.95	365.41	238.61	105.53	-	26.01	71.78	16.00	-
APRIL	2531.18	918.87	-	130.50	334.63	238.61	44.34	-	580.28	267.95	16.00	-
MAY	1925.01	915.02	-	-	405.90	240.55	85.93	35.50	213.35	12.76	16.00	-
JUNE	2198.55	915.02	-	-	445.65	238.61	74.73	-	173.77	334.77	16.00	-
JULY	2410.12	917.00	-	-	487.37	-	143.59	-	208.20	513.94	8.00	132.02
AUG	2236.66	1382.74	-	-	-	238.61	98.82	-	165.49	351.00	-	-
SEPT	3213.69	944.12	-	-	965.85	-	80.24	176.56	256.20	756.32	34.40	-
OCT	2432.19	970.79	-	-	444.26	248.90	204.86	83.27	41.33	422.78	16.00	-
NOV	3591.27	909.63	-	-	448.21	238.61	150.01	136.60	667.75	952.91	17.20	70.35
DEC	4991.54	2113.25	-	270.90	418.93	238.61	198.30	455.42	310.31	825.94	16.00	143.88
TOTAL	32604.46	13271.79	-	743.85	5112.53	1921.11	1312.45	1180.15	3161.14	5286.77	187.60	427.07

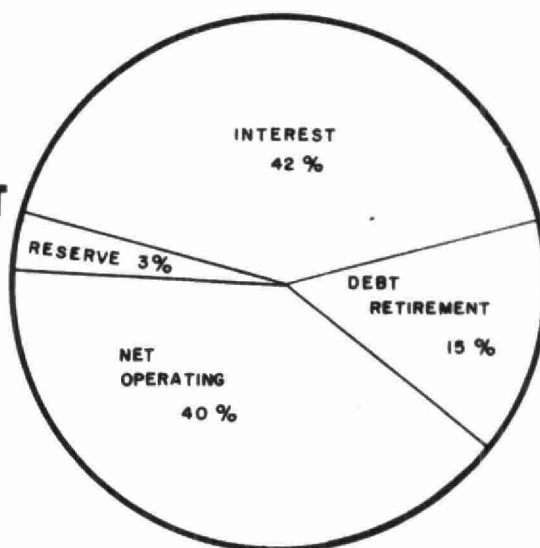
*SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$4,393.35

BRACKETS INDICATE CREDIT



1968 OPERATING COSTS

TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	M.G.TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1964	187.46	\$21,844.08	\$116.50	6 cents
1965	223.49	25,142.33	112.49	6 cents
1966	266.67	27,281.70	102.30	5 cents
1967	277.33	32,326.18	116.56	4 cents
1968	263.12	32,604.46	123.91	5 cents

Process Data

The Tillsonburg Water Pollution Control Plant has a staff of two--a chief operator and an operator--and is supervised eight hours a day during the week and three hours each on Saturday and Sunday. The staff alternates weekend duty.

FLOWS

A total of 263.12 million gallons of sewage was treated at the plant in 1968 as compared to 277.327 million gallons in 1967. The average daily flow was 718,000 gallons and represents 108% of the design capacity of the plant. This is a decrease of 6 % from 1967.

During 1968, the average daily flow on a monthly basis was below the design value of 665,000 gpd only during the months of October and November. The flow dropped slightly below the design value after the shut-down of Borden Dairy Products. The minimum day recorded was 0.486 mg in November and the maximum recorded was 1.910 mg in February. The maximum day flow was 287% of the design flow.

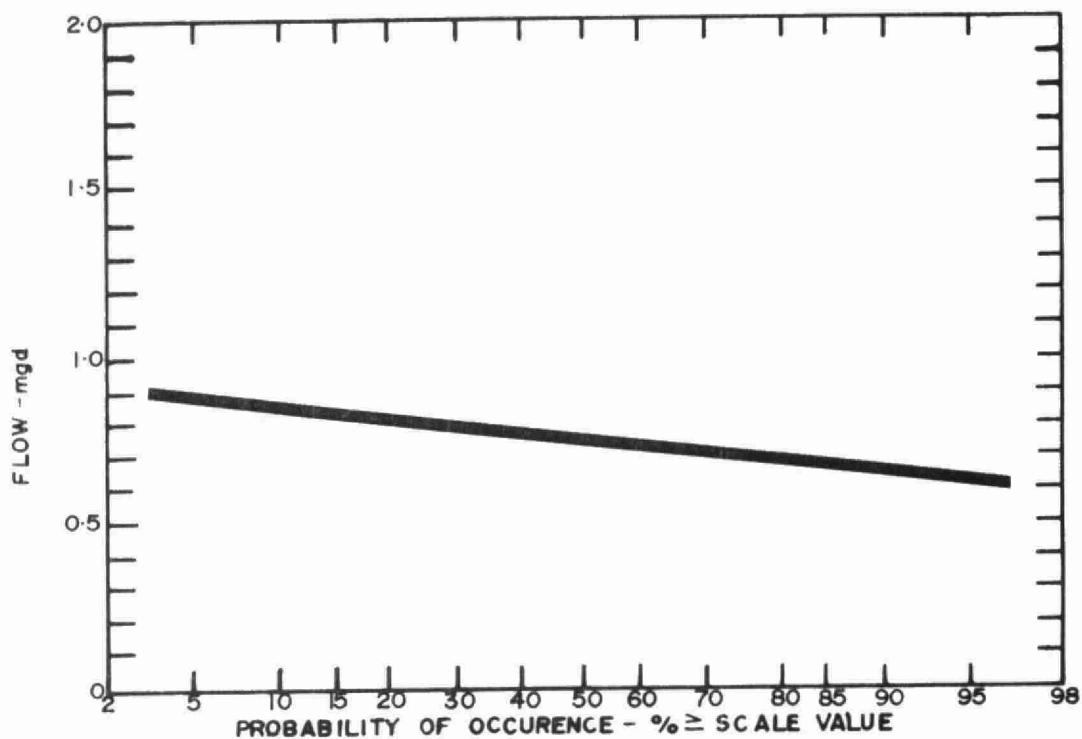
It should be noted that none of the recorded flows includes the flows that are bypassed completely around the plant and meter during periods of high infiltration. Partial bypassing occurred on a large number of days during the year; however, the quantity could not be estimated. From the probability graph it can be seen that during 1968, the design capacity of the plant was exceeded 90 percent of the time by the metered flows.

CHLORINATION

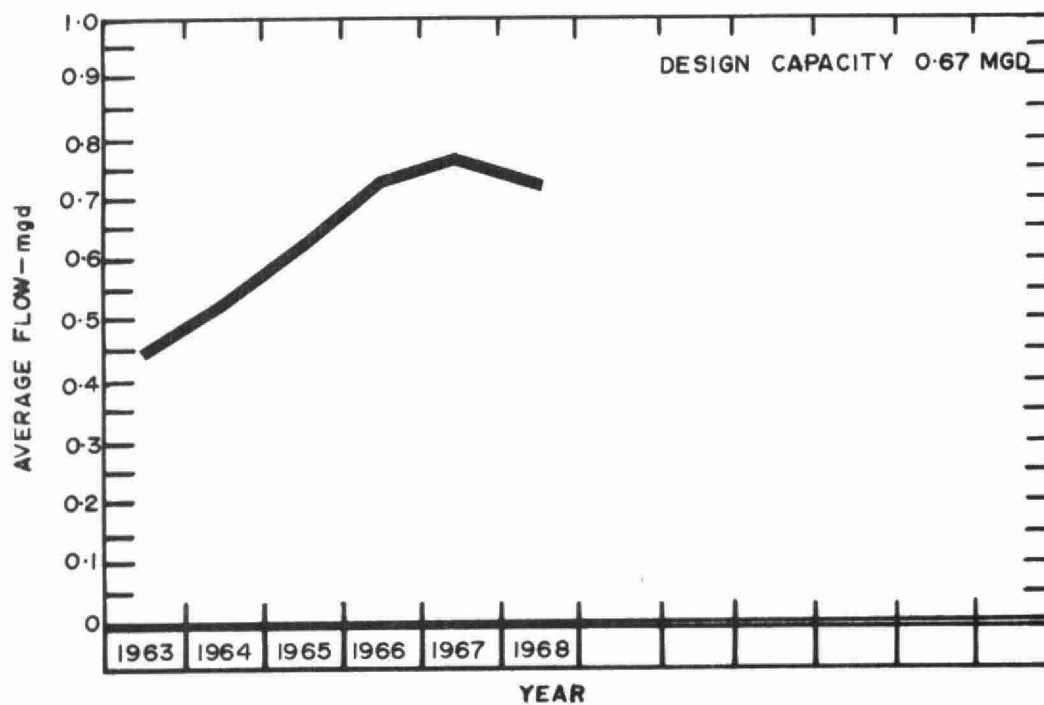
The final effluent was chlorinated for the full year. A total of 11,851 pounds of chlorine was used at an average dosage of 4.5 mg/l. The average chlorine residual was 0.5 mg/l in the final effluent prior to being discharged into Otter Creek.

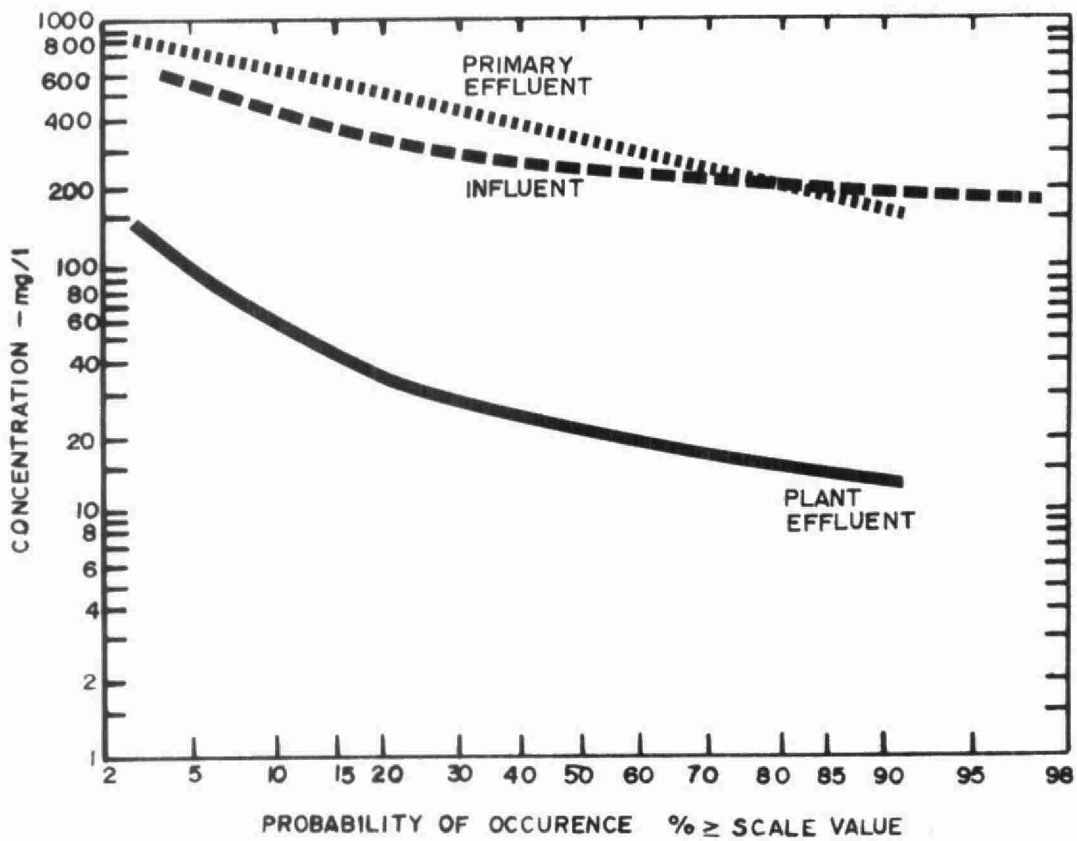
PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mg	AVERAGE DAILY FLOW mg	MAXIMUM DAILY FLOW mg	MINIMUM DAILY FLOW mg	CHLORINE USED lbs.	DOSAGE mg/l
JAN	23.39	.754	1.102	.643	594	3.8
FEB	24.49	.844	1.910	.640	796	4.3
MAR	22.60	.729	.842	.590	1011	4.5
APR	21.97	.732	.891	.578	1162	5.3
MAY	21.82	.704	.739	.642	1229	5.6
JUN	21.77	.726	.927	.640	1071	4.9
JUL	23.04	.744	.822	.673	953	4.1
AUG	23.02	.743	.890	.652	1006	4.4
SEPT	22.31	.744	.979	.646	945	4.2
OCT	20.30	.655	.816	.537	965	4.7
NOV	17.43	.581	.943	.486	956	5.5
DEC	20.98	.677	.743	.593	1163	5.5
TOTAL	263.12	-	-	-	11851	
AVERAGE	-	.718	-	-	988	4.5

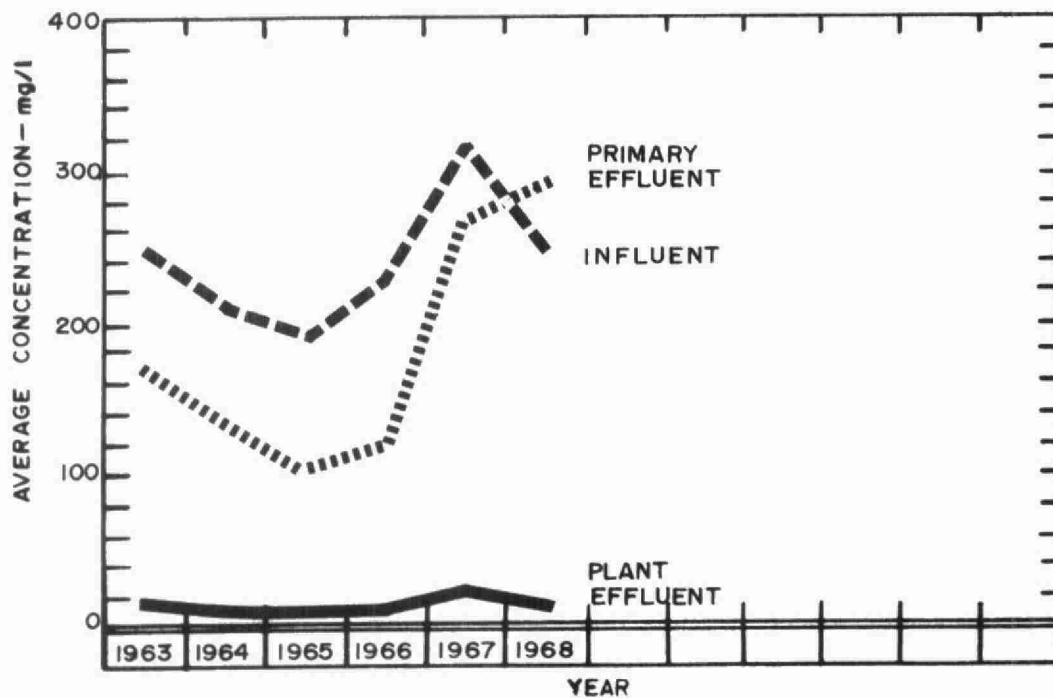


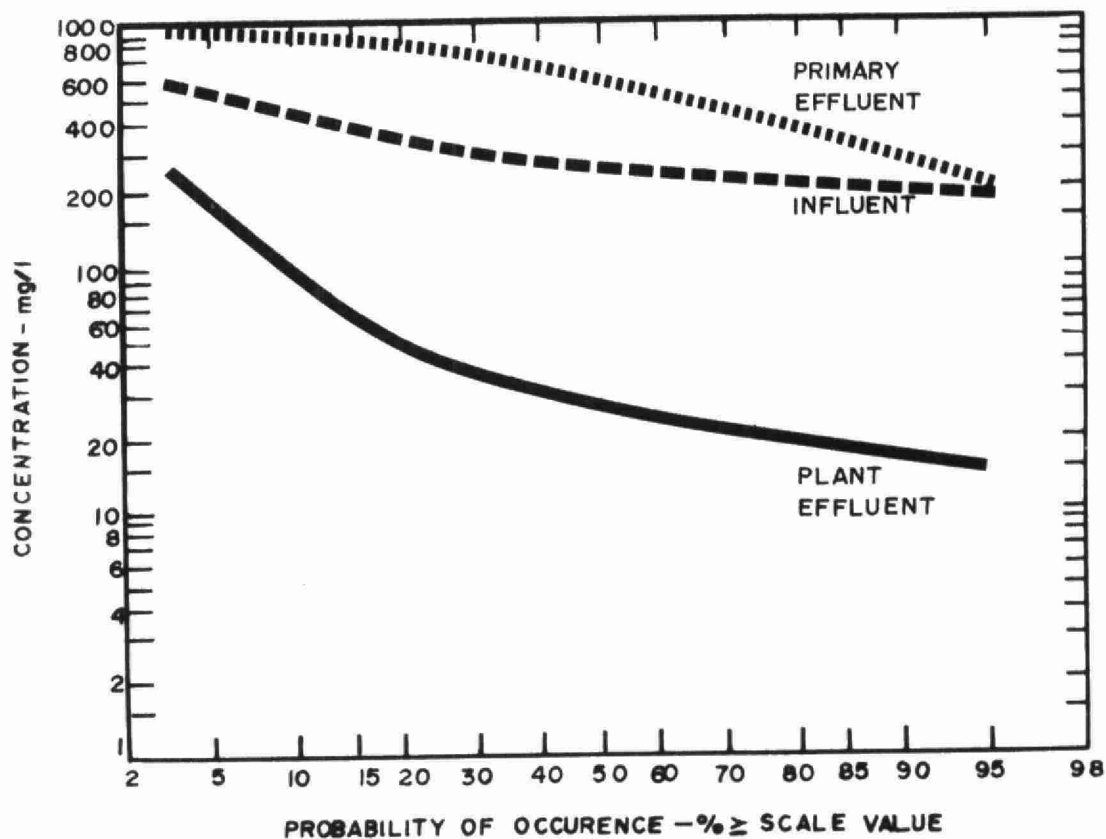
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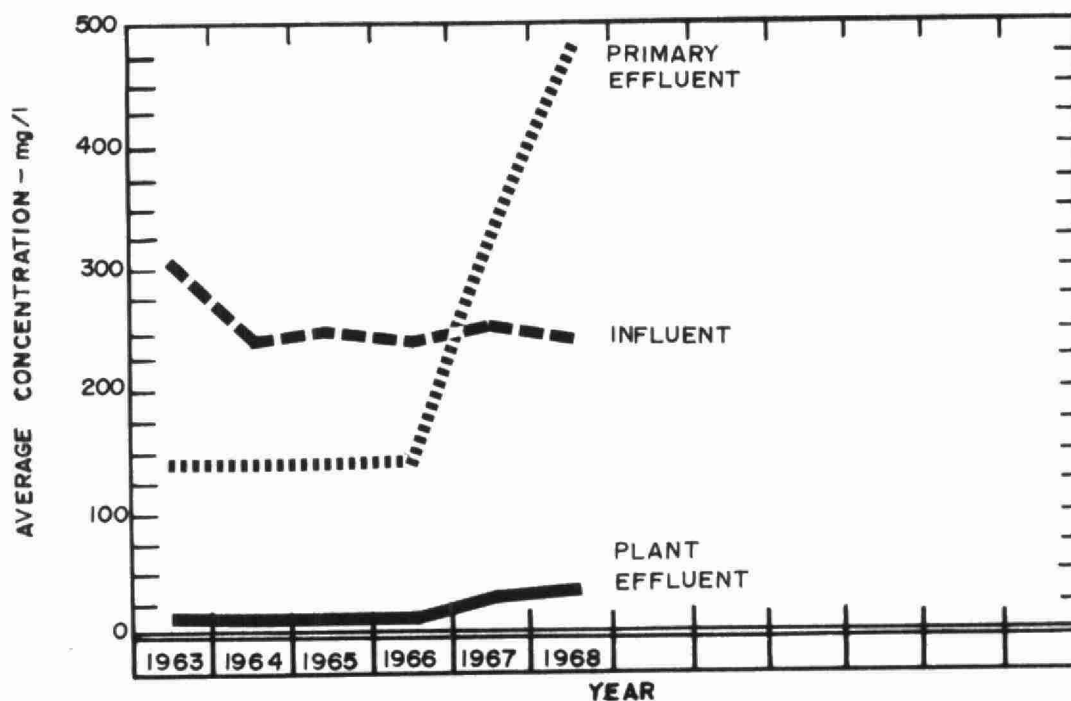


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT
	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ³ lb	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ³ lb	REMOVAL ft ³
JAN	171	12	93	37.1	210	19	91	44.7	42
FEB	266	7	97	63.4	241	13	95	55.8	56
MAR	195	12	94	41.4	198	52	74	33.0	25
APR	200	29	86	37.5	177	33	81	31.6	33
MAY	290	17	94	59.6	212	35	84	38.6	28
JUN	377	30	92	75.4	370	72	80	64.9	57
JULY	218	20	95	45.5	280	24	95	59.0	48
AUG	185	41	78	33.1	190	78	59	25.8	48
SEPT	256	10	96	54.9	289	28	90	58.2	26
OCT	392	15	96	76.5	264	18	93	49.9	31
NOV	224	10	96	37.3	193	13	93	31.4	29
DEC	187	9	95	37.4	209	20	90	40.0	36
TOTAL	-	-	-	599.1	-	-	-	532.9	459
AVERAGE	247	18	93	49.9	236	34	86	44.4	38

COMMENTS

A raw sewage having an average strength of 247 mg/l BOD and 236 mg/l suspended solids was treated in 1968. The final effluent had an average strength of 18 mg/l BOD and 34 mg/l suspended solids representing reductions of 93% and 86% respectively. The final effluent exceeded the Ontario Water Resources Commission's objectives of 15 mg/l for BOD 75% of the time and for suspended solids 90% of the time.

A total of 599,100 pounds of BOD and 532,900 pounds of suspended solids was removed during the year. This is a decrease of 210,710 pounds of BOD and 116,860 pounds of suspended solids over the 1967 values.

The effluent results show the inability of the present plant to treat the sewage now entering the plant. The modification of the aeration section in 1967 did improve treatment, but the amount of additional load that this plant can handle is limited.

A total of 459 cu. ft. of grit was removed at an average of 38 cu. ft. per month. This represents a grit removal of 1.68 cu. ft. per million gallons of raw sewage.

AERATION

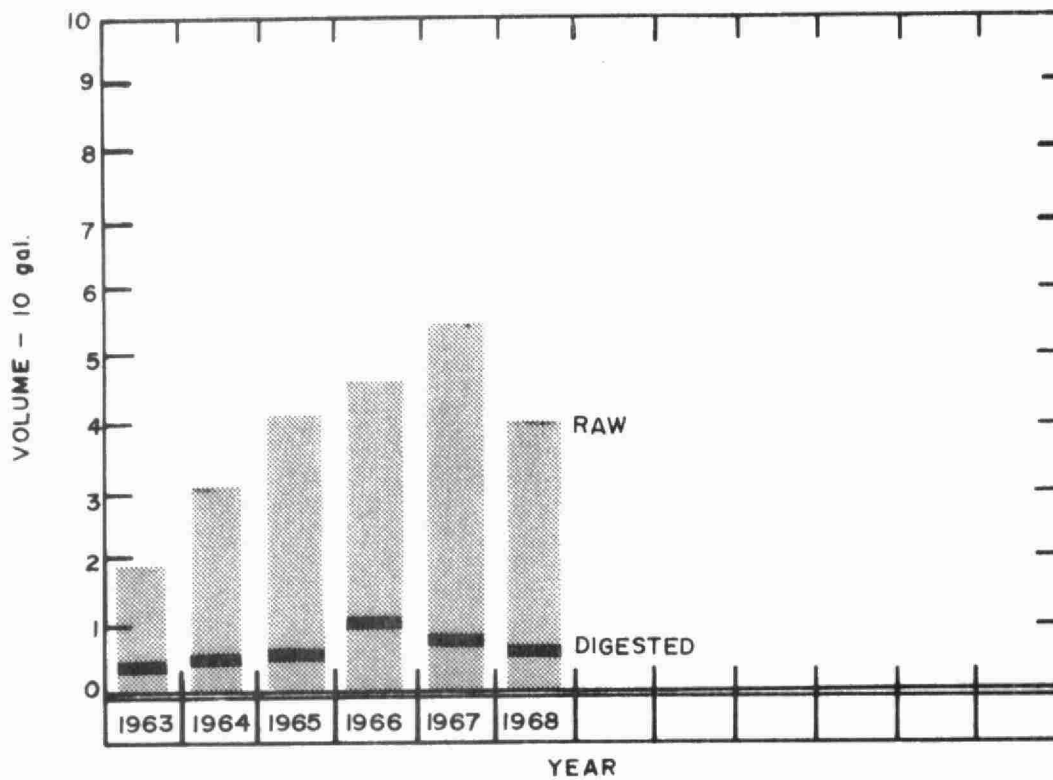
MONTH	AVERAGE FLOW mgd	PRIMARY EFF		SECONDARY EFF		MLSS CONC ^N mg/l	F/M ($\frac{\text{lb BOD}}{\text{lb MLSS}}$)	AIR USED ($\frac{1000 \text{ ft}^3}{\text{lb BOD}}$) REMOVED	WASTE SLUDGE lb
		BOD CONC ^N mg/l	SS CONC ^N mg/l	BOD CONC ^N mg/l	SS CONC ^N mg/l				
JAN	.754	124	317	12	19	1,860	.18	1.50	-
FEB	.844	206	336	7	13	1,730	.36	.75	-
MAR	.729	186	293	12	52	1,810	.26	.99	-
APRIL	.732	227	323	11	9	1,840	.32	.87	-
MAY	.704	480	491	11	13	1,970	.61	.64	-
JUN	.726	433	619	12	12	1,890	.37	.80	-
JUL	.744	368	817	10	13	5,840	.17	.96	-
AUG	.743	395	842	26	13	2,300	.45	.92	-
SEPT	.744	403	710	10	25	2,500	.41	.81	-
OCT	.655	388	592	15	18	2,400	.28	1.02	-
NOV	.581	198	203	10	13	1,600	.25	1.57	-
DEC	.677	110	158	9	20	1,400	.20	2.15	-
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	.718	293	475	12	18	2,260	.32	1.11	-

COMMENTS

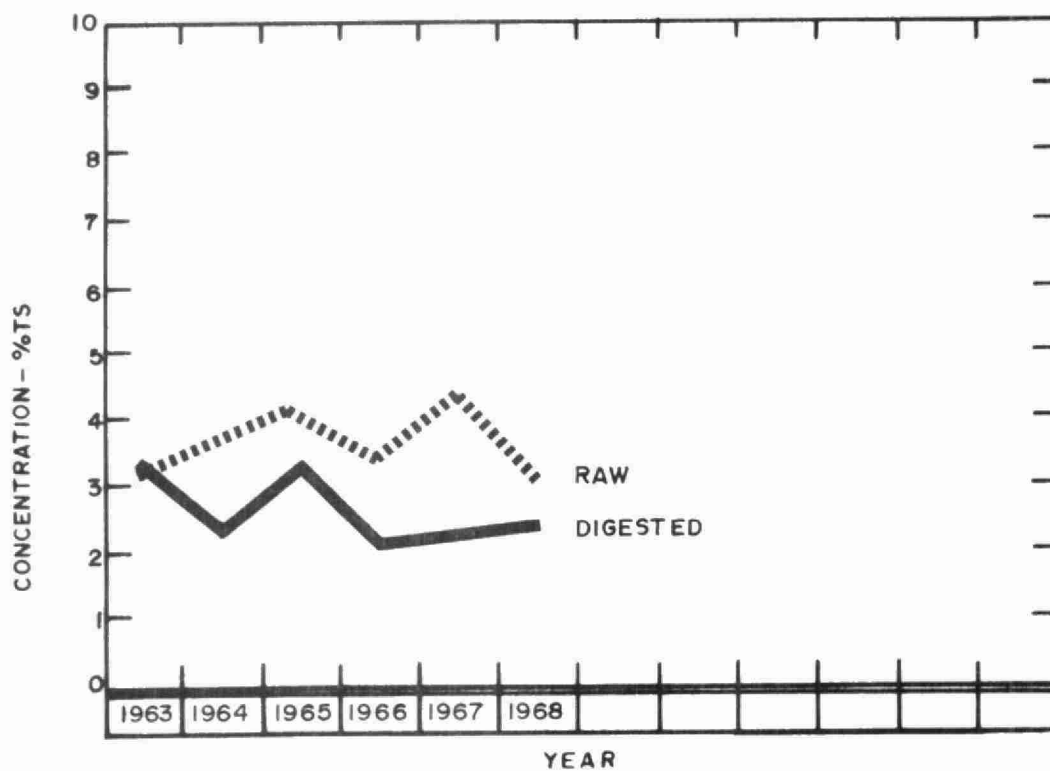
The average BOD of the primary effluent to the aeration section was 293 mg/l, which was 46 mg/l higher than the raw sewage value due to recirculation of supernatant. The average suspended solids of the primary effluent to the aeration section was 472 mg/l which was 239 mg/l higher than the raw sewage value.

The actual secondary effluent had average values of 12 mg/l BOD and 18 mg/l of suspended solids. The final effluent of 18 mg/l of BOD and 34 mg/l of suspended solids is higher because of the mixing of some primary effluent with the secondary effluent.

During 1968, the average MLSS was 2260 mg/l, resulting in an average loading of .32 lbs. of BOD per lb. MLSS. An average of 1110 cu. ft. of air was supplied, which is approximately equal to the 1967 re-



DIGESTION



SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10 ⁵ gal	T. S. %	V. S. %	VOLUME 10 ⁵ gal	T. S. %	V. S. %	VOLUME 10 ⁵ gal	T. S. %	DIGESTED yd ³	RAW yd ³
JAN	5.02	2.5	-	.77	2.3	-	4.21	-	455	-
FEB	3.85	3.7	-	.59	2.5	-	3.96	-	351	-
MAR	3.93	3.0	-	.31	2.6	-	4.13	-	182	-
APR	4.20	3.1	-	.57	2.4	-	3.93	-	338	-
MAY	2.87	3.6	-	.70	2.7	-	1.99	2.8	494	78
JUN	2.79	-	-	.66	-	-	1.93	-	390	-
JUL	3.11	2.3	-	.78	2.4	-	1.99	2.4	464	-
AUG	3.07	-	-	.66	2.4	-	1.99	2.3	451	64
SEPT	2.89	3.2	-	.71	-	-	1.93	-	425	160
OCT	2.83	4.4	-	.71	2.5	-	1.93	1.9	424	228
NOV	2.30	3.2	-	.62	-	-	1.74	-	370	-
DEC	3.17	3.4	-	.52	-	-	2.70	-	312	-
TOTAL	40.03	-	-	7.60	-	-	32.43	-	4656	530
AVERAGE	3.33	3.2	-	.63	2.5	-	2.70	2.4	388	133

COMMENTS

In 1968 approximately 4 million gallons of raw sludge was pumped to the digester. A total of 0.76 million gallons of digested sludge at an average concentration of 2.5% was trucked away for disposal. This amounted to 2.18% of the raw sludge pumped to the digester or 19.7 cu. yd. per million gallons of raw sewage.

An additional 530 cu. yards of raw sludge or the equivalent of 2 cu. yds. of sludge per million gallons of raw sewage was hauled without being treated by digestion due to the digester's inability to handle this load.

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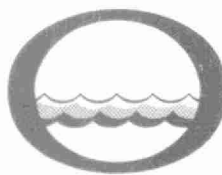


CONCLUSIONS

The flow to the plant passed the point where plant expansion is absolutely necessary in 1967. This is indicated by the average daily flow for 1967 being 114% of the design flow and the average daily flow for 1968 being 108% of the design flow. In addition, the Ontario Water Resources Commission objectives were not met 75% of the time for BOD removal and 90% of the time for suspended solids removal. A review of the data after the closing of the Borden Dairy Co. does not indicate a reduction in loading sufficient enough to warrant cancellation of plans for expansion of the plant.

RECOMMENDATIONS

Complete plans for the expansion of the plant, as prepared by the consulting firm of R. V. Anderson, should be implemented without further delay.



Water management in Ontario